Preoperative Optimization and Surgical Site Infection Reduction

David Evans, MD
Medical Director of Trauma Services
Associate Professor
Department of Surgery
Division of Trauma, Critical Care and Burn
The Ohio State University Wexner Medical Center

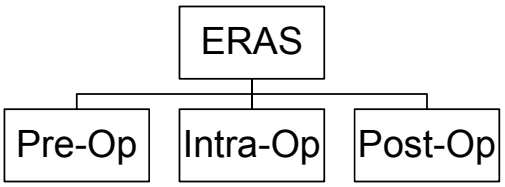
Objectives

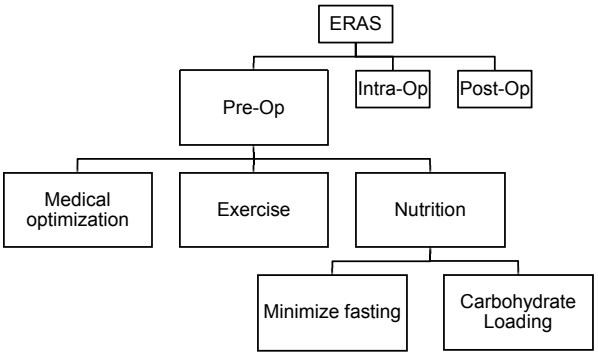
- **Introduce Enhanced Recovery (ERAS)**
- **Discuss Preoperative Optimization**
- **Surgical Site Infection Risk Reduction Strategies**

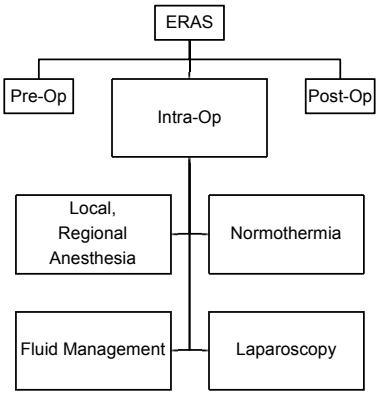
Preoperative Optimization

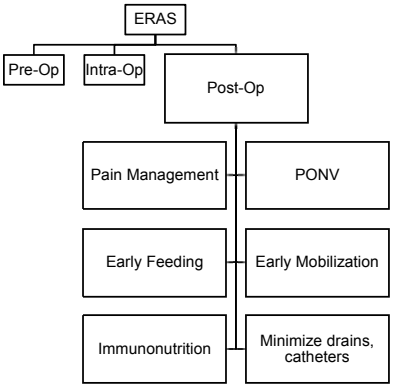
- **Meet Tim**
- **55 yo male with new colon cancer**
- **Poor appetite**
- **Smoker**
- **COPD on albuterol prn**
- **BMI 40**
- **History of 10 lb unintentional weight loss over past month**

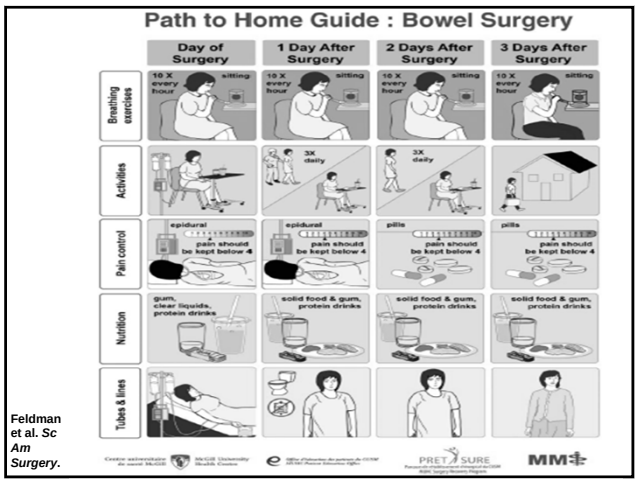
Enhanced Recovery Pathways







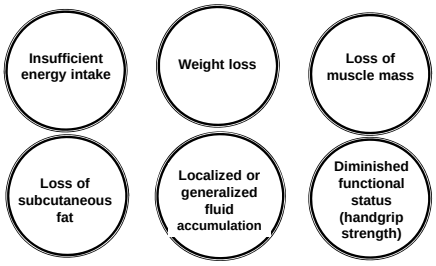




Feldman et al. *Sc Am Surgery.*

Diagnostic Characteristics of Malnutrition

Identification of two or more of these six criteria is recommended for diagnosis:



White JV, et al. *JPEN J Parenter Enteral Nutr*. 2012;36:275-283.

Loss of Muscle Mass and Function Can Now Diagnose Malnutrition, Independent of Body Weight

Insufficient energy intake

Type of malnutrition	Acute illness or injury-related	Chronic disease-related	Social or environmental cause
Moderate	<75% of est. energy requirement for >7 days	<75% of est. energy requirement for ≥1 month	<75% of est. energy requirement for ≥3 months
Severe	≤50% of est. energy requirement for ≥5 days	≤75% of est. energy requirement for ≥1 month	≤50% of est. energy requirement for ≥1 month

White et al, JPEN 2012

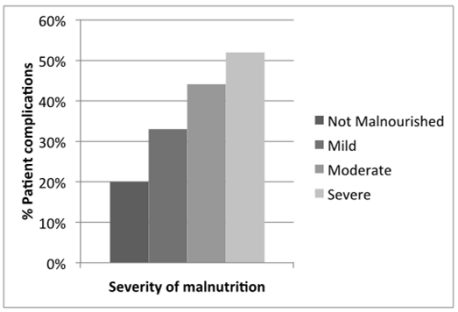
Weight loss

Type of malnutrition	Acute illness or injury-related		Chronic-disease related		Social or environmental cause	
Moderate	%	Time	%	Time	%	Time
	1–2 5 7.5	1 week 1 month 3 months	5 7.5 10 20	1 month 3 months 6 months 1 year	5 7.5 10 20	1 month 3 months 6 months 1 year
Severe	%	Time	%	Time	%	Time
	>2 >5 >7.5	1 week 1 month 3 months	>5 >7.5 >10 >20	1 month 3 months 6 months 1 year	>5 >7.5 >10 >20	1 month 3 months 6 months 1 year

White et al, JPEN 2012

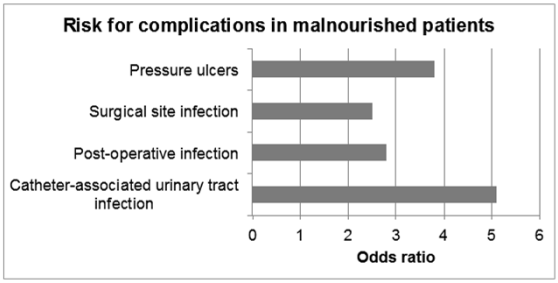
Effect of Malnutrition on Surgical Complications

N = 100 patients



Sungurtekin H, *J Am Coll Nutr.* 2004;23:227-232.

Increased risk of post-surgical complications



Pre-existing malnutrition increases risk for post-surgical complications by 2- to 5-times.

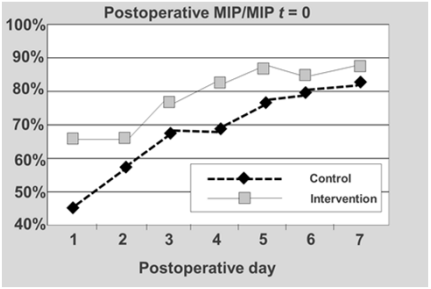
Fry DE, et al. *Arch Surg.* 2010;145:148-151.

Surgery is a sport – train!

Goal: Increase / maintain muscle mass to improve surgical outcomes

Beattie et al. A randomised controlled trial evaluating the use of enteral nutritional supplements postoperatively in malnourished surgical patients Gut 2000.

Evidence for Preoperative Pulmonary Exercise



MIP: maximum inspiratory pressure

Source: Dronkers et. al. Clin Rehabil 2008 vol. 22 no. 2 134-142

Quit Smoking to Reduce SSI

- The odds ratio for SSI in smokers is 1.51 (95%CI,1.20-1.90; P < .001)
- The odds ratio for SSI if smoking on the day of surgery is 1.96 (95%CI, 1.23-3.13; P < .001)

JAMA Surg. 2017;152(5):476-483

Real World Application of Immunonutrition Preoperative Oral Supplements: The Strong for Surgery Project

- **Elective Colorectal Procedures w/ anastomosis**
- **Composite Adverse Event Rate (Reintervention, Infection, Anastomotic Leak and/or Death)**
  - **No preoperative supplements 9.4%**
  - **Preoperative immunonutrition 7.1%**
  - **Did not reach statistical significance**
- **Length of Stay improved with immunonutrition**

STRONG for SURGERY

Thornblade et al. Dis Colon Rectum. 2017 Jan; 60(1): 68–75.

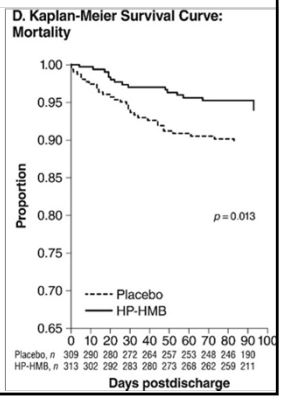
The Power of Oral Nutritional Supplements

High protein oral vs. placebo.

Primary Endpoint was readmission

Study Population:

Congestive heart failure (CHF)
Acute myocardial infarction (AMI)
Pneumonia (PNA)
Chronic obstructive pulmonary disease (COPD)



Deutz et. al. Clinical Nutrition. 2016 Feb;35(1):18-26

SSI Reduction – Gametime!

- **Skin care is crucial to SSI reduction**

Postoperative Skin Care

- Epithelialization occurs in 48 hours
- Dressings changed before 48 hours require sterile technique
- Most wounds ok for gentle soap/water shower (not bath/soak) after 48 hours

Wound Healing and Abdominal Core Health

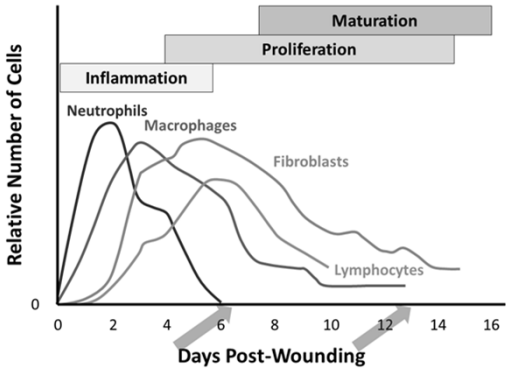
Benjamin K. Poulose, MD, MPH, FACS
Robert M. Zollinger Lecrone-Baxter
Professor of Surgery
Chief, Division of General & Gastrointestinal Surgery
Co-Director, Center for Abdominal Core Health
The Ohio State University Wexner Medical Center

Topics Today

- General concepts of wound healing
- Practical guide to wound infection
- Abdominal Core Health

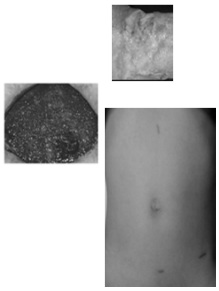
GENERAL CONCEPTS OF WOUND HEALING

Phases of Wound Healing



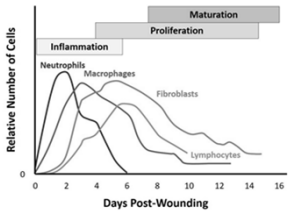
Characteristics of the Phases

- **Inflammation -> Exudate**
- **Proliferation -> Granulation**
- **Maturation -> Contraction**



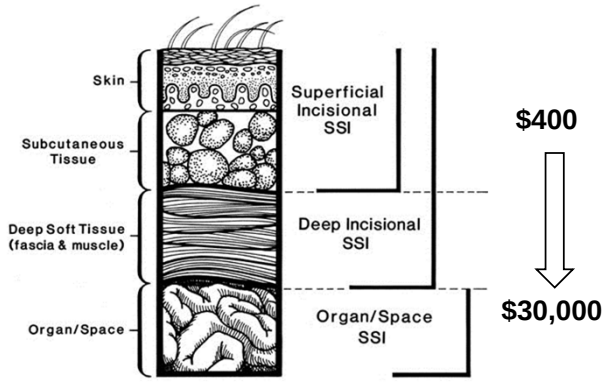
Clinical Implications

- **1 week postop -> protect incision from excessive stretching/moisture**
- **2-3 weeks postop -> increase activity**
  - *****use pain as your guide**



PRACTICAL GUIDE TO WOUND INFECTION

Surgical Site Infection

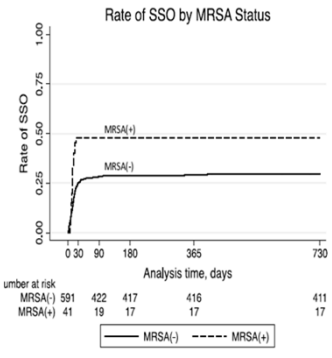


Infect Control Hosp Epidemiol. 1999 Apr;20(4):250-78; quiz 279-80.

Surgical Site Occurrences

- Include all SSIs
- Expand to include other wound events
  - Wound cellulitis
  - Non-healing incision
  - Fascial disruption
  - Skin/soft tissue ischemia
  - Skin/soft tissue necrosis
  - Serous/purulent drainage
  - Stitch abscess
  - Seroma/hematoma
  - EC fistula

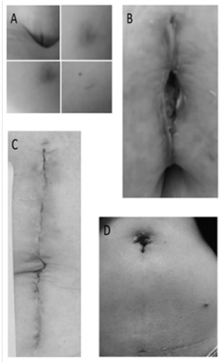
When Do SSOs Occur? Not Just 30 Days!



Baucom, R.B., Ousley, J., Oyefule, O.O. et al. Hernia (2016) 20: 701.

How Do You Recognize a Wound Infection?

- Erythema, heat, swelling, pain…and drainage
- Sometimes can be difficult to differentiate normal postop inflammatory phase of wound healing vs an infection
- Best approach is to follow incision over time

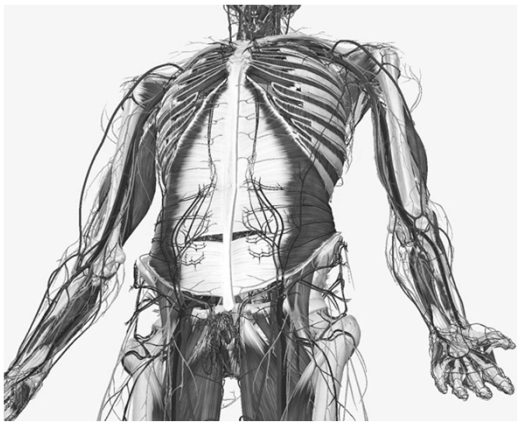


A-Normal
B-SSO
C-SSI (superficial)
D-Normal

How Do You Treat a Wound Infection?

- **Oral antibiotics for wound cellulitis (consider patient risk factors)**
- **If anything more severe->needs wound opening and local wound care**
  - **Local wound care – BID packing with iodoform gauze, BID damp to dry with Kerlix, negative pressure dressing**
- **If signs/symptoms of sepsis->need aggressive treatment**
  - **Aggressive treatment: admission, IV antibiotics, operative debridement, prosthetic removal**
- **If any doubt or concern->talk you your proceduralist**
  - **Communication is key for effective postoperative care; ***PARTNERSHIP**

ABDOMINAL CORE HEALTH

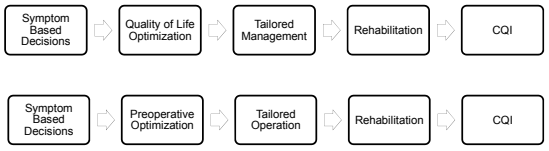


Abdominal Core Health
Spectrum of Disease

Hernia **Chronic Pain** **Back**

Diastasis **Intrinsic Pathology** **Pelvic Floor**

Abdominal Core Health
Patient Experience



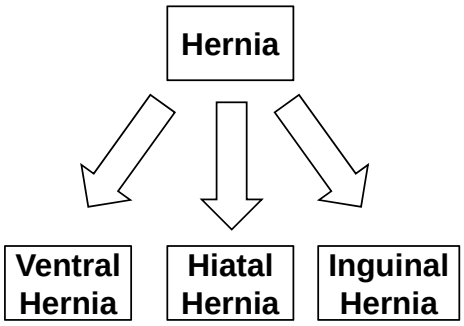
THE OHIO STATE UNIVERSITY
WEXNER MEDICAL CENTER

Center for Abdominal Core Health

Abdominal Core Health
Spectrum of Disease

Hernia **Chronic Pain** **Back**

Diastasis **Intrinsic Pathology** **Pelvic Floor**



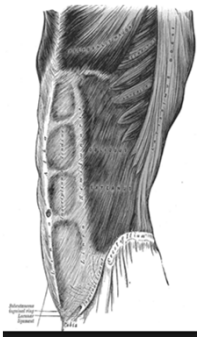
Common Themes To All Hernias

- Management based on symptoms
  - Exceptions: femoral hernias in women, Spigelian hernias
- Diagnosis made by physical exam
  - Adjuncts can help (CT/US->ventral and femoral; US->inguinal)
- Continuum from normal->hernia can make diagnosis challenging

Incarceration and Strangulation

- Incarceration (opposite: 'Reduceable')
  - Chronic
  - Acute
- Strangulation
  - Incarceration with ischemic or functional compromise
  - Acute

Ventral Hernia



Henry Gray (1918) *Anatomy of the Human Body*
Bartleby.com: Gray's Anatomy, Plate 392
Author: Henry Vandyke Carter

Ventral Hernia

Spontaneous	Acquired

• Midline
  • Umbilical
  • Epigastric
  • Hypogastric (rare)
• Lateral
  • Spigelian
	• Incisional
	  • Subxyphoid
	  • Suprapubic
	• Traumatic

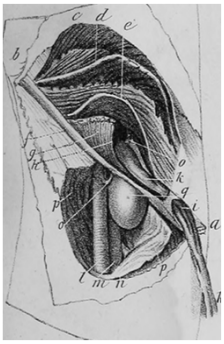
Choices for Repair

- Open vs Minimally Invasive (robotic or laparoscopic)
- Location of mesh
- Type of mesh

Goals of Repair

- Improve quality of life and overall well being
- Minimize risk of recurrence (?chronic disease?)

Inguinal Hernia and Myopectineal Orifice



Types of Hernia in This Region

- Inguinal hernia
- Femoral hernia
- Obturator hernia

Choices for Repair

- Open vs Minimally Invasive (robotic or laparoscopic)
- Open – mesh based or tissue based
- Special situations
  - Open infra-inguinal approach to femoral hernia
  - Laparoscopic approach to obturator hernia

Goals of Repair

- Improve quality of life
- Minimize chronic groin pain
- Minimize recurrence